REFORM IN RAILROAD PASSENGER FARES.

In the last four or five years a strong agitation has been going on in Germany and Austria for a change in the system of making up railroad passenger tariffs. It has resulted in a radical departure from the old methods in the case of two great systems of railways, those in Hungary and Austria. As the movement seems destined to spread, it may be worth while to examine certain aspects of it which may prove of interest to Americans as well as Europeans.

The agitation was begun in Germany by F. Perrot, a practical railroad man of long experience, more than twenty years ago. In a pamphlet published in 1869, Perrot attempted to show by statistics that the then prevailing system of making up railroad tariffs (which is the one still in force in nearly all countries) rests upon false assumptions, and that, in the railway as in the postal service, distance and weight have not the importance usually attributed to them. He proposed to abolish all existing tariffs, and to substitute in their place a simple system, very similar to that in force in the post-office. For the passenger service he suggested a uniform rate of five groschen for the third class, ten for the second, and sixty for the first. For the freight service he proposed a simple method, based on the amount of space occupied in the car and on the number of packages. All freights were to be placed in one of three classes.

The *brochure* attracted much attention, and was followed by a series of articles in various magazines and papers. It had doubtless some effect in shaping the railroad policy in Alsace-Lorraine at the time the roads passed from French to German control. In 1872, Perrot

collected his various essays and papers, together with one by Professor Wagner, and published them in book form, under the title of *The Application of the Penny-postage Principle to Railroad Traffic and the Package Service.** The principle was adopted about the same time in the express service conducted by the German post-office.

Perrot, it may be said, was not by any means the first to propose a reform in the passenger tariff. The agitation had begun in England as early as 1840. William Galt urged in 1843 a radical reduction of railway fares, claiming that one-eighth penny per mile was an amply sufficient charge for trains going at the rate of fifteen miles per hour, and one-third penny sufficient for trains making twenty-five miles per hour. He insisted that the railroads would make more at this rate than at any higher one.† The same writer published another work in 1865 on Railway Reform, in which he returned to the idea of a great reduction in fares.‡ Raphael Brandon had already addressed a public letter to Gladstone in 1864 on the subject of railway fares, and followed this up in 1868 with a small pamphlet, in which he demanded the introduction of a uniform rate of threepence for third class and sixpence for second class throughout the kingdom.§ This was possibly the occasion of Perrot's pamphlet of the following year. It attracted much attention in England, but produced no direct results.

It should also be said in this connection that a similar plan, though with important modifications, had been proposed by Professor William Scharling, of Copenhagen, in

* *Die Anwendung des Penny-Porto-Systems auf den Eisenbahntarif und das Packet-Porto.* F. Perrot: Rostock, 1872.

† *Railway Reform, its Expediency and Practicability considered.* London, 1843. [Quoted in Cohn's *Englische Eisenbahnpolitik*, vol. i. p. 99.]

‡ William Galt, *Railway Reform, its Importance and Practicability considered as affecting the Nation, the Shareholders, and the Government.* London, 1865.

§ *Railway and the Public: How to make Railways Remunerative to the Public and Profitable to the State.* London, 1868. [Compare Cohn, vol. ii. p. 538.]

a pamphlet in 1867, before he knew of Brandon's scheme.* Various articles also appeared upon the subject from time to time, but without producing any further apparent result than helping to keep alive and stimulate a scientific interest in the matter.

Julius Lehr, in his work on *Railroad Tariffs and Railroad Monopoly* published in 1879, devotes some twenty pages to a discussion of the "zone-system," as applied to passenger traffic.† He is a decided opponent of any system resembling it in any way. J. F. Schreiber, an Austrian railroad inspector, in his book on *Railroad Tariffs* published in 1884, mentions Perrot's scheme to condemn it, and disposes of the whole subject by saying that railway passenger rates in Austria were at that time low enough, though it might be well to arrange rates so that the average distance traversed by each passenger might be lengthened.‡ Franz Ulrich, a Prussian railroad manager, in his great work on *Railway Tariffs* published in 1886, gives a brief discussion of Perrot's ideas; but it is plain that they do not strike him very favorably, though one can also see from his remarks that there has been a great development in the theories of railroad managers since 1872.§

A new era was opened in the whole subject by the agitation begun in 1883–85 by Theodore Hertzka, the well-known Austrian economist. Mr. Hertzka undertook by a systematic effort to convince railroad managers in Austria that the time had come for a decided reduction in passenger rates, and proposed a zone-tariff system as the

* *Frimärkesystemet og Jeernbaneine. Forslag til en lav, ensformig Jeernbanetaxt.* Kopenhagen, 1867.

† *Eisenbahntarifwesen und Eisenbahnmonopol.* Dr. Julius Lehr: Berlin, 1879. p. 198 and following.

‡ J. F. Schreiber, *Das Tarifwesen der Eisenbahnen.* Wien, Pesth, Leipzig. p. 251.

§ *Das Eisenbahntarifwesen im Allgemeinen.* By Franz Ulrich. Berlin and Leipzig. 1886. pp. 504.

best method of inaugurating the reform, although he called his plan a uniform, and not a zone-tariff, system. In numerous articles in the *Wiener Allgemeine Zeitung* and in various addresses in the "Club Oesterreichischer Eisenbahnbeamten" he urged his views, with an energy and persistency which augured well for his ultimate success. In 1885, he published with a brief introduction an address delivered in the club under the title of "Passenger Charges." He appended to this a number of the speeches made in reply to his address, with a further reply of his own to his opponents.* This work excited much attention, and was the occasion of a valuable article in Conrad's *Jahrbücher* by Professor Scharling, of Copenhagen, in which he expressed his general agreement with the views advanced by Hertzka.† He gave in the article the history of an experiment in Denmark in the direction of uniform low rates, on a short railroad running from Copenhagen to certain seacoast towns. The experience on this line bore out fully the idea of Professor Scharling as expressed in the pamphlet already mentioned, that the railroads would make greater profits at lower rates. The discussion started by Hertzka was kept up more or less actively for a year or two, when the ranks of the agitators for cheaper fares were again increased by the accession of Eduard Engel, who in 1888 published a little work on railway reform.‡ As this book was written in a pleasing style, it reached a comparatively wide public, and greatly strengthened the effect of Hertzka's book, though the author disagreed at many points with the proposals of the latter.

* *Das Personenporto. Ein Vorschlag zur Durchführung eines billigen Einheitstarif im Personenverkehr der Eisenbahnen und die Discussion darüber im Club Oesterreichischer Eisenbahnbeamten.* Von Dr. Theodor Hertzka. Wien, 1885. pp. 178.

† *Das Personenporto der Eisenbahnen.* Von Dr. William Scharling; in *Jahrbücher für Nationalökonomie*, 1886. p. 289.

‡ *Eisenbahnreform.* Eduard Engel. Jena, 1888. pp. 218.

In the mean time, the leaven was evidently working in the minds of railway managers. More and more attention had been given in the leading railway offices of Germany and Austria to these scientific investigations of railway tarification, and the popular agitation in favor of lower fares had begun to influence the thought of railway managers. The first management to take a positive step in the direction of a change was the State Railway Office of Hungary. I have not been able to learn the whole history of the movement within railway circles in Hungary which ultimately led to such a radical experiment as that finally determined upon. It is probable that the course of popular and scientific discussion had considerable to do with it. The chief cause, however, is undoubtedly to be sought in that circumstance which has been the occasion of nearly all great experiments in railway matters; namely, necessity. The condition of the State roads was far from satisfactory, and the condition of the passenger traffic was the least satisfactory element in the case. The total traffic was small, the cost of service, consequently, very high, and the rates charged enormous, considering all the circumstances. The lowest rate for a single ticket was over one cent per kilometre for a long-distance through ticket, third class; *i.e.*, nearly two cents per mile. The rate for first class was nearly four cents per mile.

At such prohibitive rates it is plain that no very large traffic could be developed in a country like Hungary, where the great middle class is by no means well-to-do and the poorer class is very poor, and where, moreover, the population is not dense, comparatively speaking, and large cities are few in number.* To how small an extent the railroads were utilized by the people is shown by the

*The population of Hungary, including Transylvania, is 137 per square mile, the total population being about 15,000,000. England had in 1881 446 inhabitants per square mile; Scotland, 125; Ireland, 159; France in 1886, 187; Germany in 1885, 222; Italy in 1888, 267.

fact that, while Germany had five passengers per head of the population, Hungary had only one. The average length of trip in Hungary was 61 kilometres, while in Germany it was only 28 kilometres,—a fact which shows that the local traffic in Hungary was unusually small, prevented of course in its growth by the prohibitive rates in force.* Various attempts had been made to encourage the growth of passenger traffic by the introduction of reduced rates in the form of return, excursion, commutation, and mileage tickets, and the like; but, although the traffic responded immediately, the rate of increase was not such as to show that the hoped for growth in revenue would result at any near date. The government, therefore, determined upon a radical change in working out the details of the system, and laid down certain broad principles to be observed.

One of the prime objects was the encouragement of long-distance traffic, and more especially the traffic to and from the capital city, Buda-Pest. In this point, the government was actuated not merely by railroad considerations,—though these, too, were in favor of such a policy,—but also by social and industrial motives. Buda-Pest is not only the capital city, but it is the metropolis in wealth, industry, population, and political influence of the whole State. A policy which would secure the actual visiting of this centre by large numbers of the people from the most distant parts of the kingdom could not but result in securing a greater homogeneity in the population, and hasten that fusion of the various elements which is in the interest of all higher development in Hungary.

To attain this end, it was necessary to adopt a system of tarification which would eliminate as far as possible the

*Le *Tarif per Zones en Hongrie.* Buda-Pest: Imprimerie Victor Hornansky. 1890. This document, prepared by the Hungarian government, and containing many details relative to the new system, was recently issued in an English translation in the *Annals of the American Academy of Political and Social Science*, July, 1890, p. 107 and following.

element of distance. This would be achieved by making a long-distance rate relatively so low as to encourage this class of traffic. To secure a large traffic, it would also be necessary to make a rate which should be, not only relatively, but absolutely low,—a rate so low as to be within the reach of large classes of the population. To prevent an undue burdening of local traffic, it would also be necessary to reduce local rates to a point far below what they had been before,—to make a rate which should be within the reach of everybody. Under the old system the peasant who had ten miles to go could far better afford to walk than to pay the rate demanded. Under the new system the rates must be so low that even the day-laborer would use the trains from station to station. The new system must also be a very simple one, in which a great saving in administrative supervision and in manipulation of tickets and the like could be made.

As a result of all these considerations, the authorities worked out a new system of tarification, which seemed to them likely to incorporate these features. The general plan adopted had already received the name of zone-method in the discussions which had occurred, from the time of 1870 if not earlier. As this name was also adopted by the government of Hungary, the system has become known throughout the world as the zone-tariff system.

The zone-tariff system is not, philosophically speaking, fundamentally different from the mileage system in use in this country, except so far as a difference of degree may constitute a difference in kind. The system in use in this country is that under which the mile is adopted as the unit of distance. For this unit a normal rate is fixed, and the price of a ticket is ascertained by multiplying the rate per mile by the number of miles travelled, fractions of a mile being disregarded or considered as a mile in fixing the price of a ticket. On the continent the kilometre is

usually adopted as the unit of calculation. A foot might be taken as the normal unit, or two miles, or ten miles, or any other number. It is evident that the exact unit taken will depend ordinarily, or has at least ordinarily depended, on the unit of distance most commonly used in describing journeys of hours or days.

Now, the zone-tariff system is simply a system in which the unit of distance is a much larger unit than the kilometre or the mile. This will appear more clearly when the Austrian zone-tariff is considered. It is plain, however, in the Hungarian system also, though it is there subject to important modifications. For each unit of distance (or zone), or fraction thereof, from any station a fare of ten cents is exacted.* Thus the fare for one unit and a fraction of another is twenty cents; for two units and a fraction of another, thirty cents; for three units and a fraction of another, forty cents; and so on up to the eleventh unit, when a sum of twenty cents is charged for each unit or fraction thereof: with this important modification, that the thirteenth unit includes all stations beyond the completed twelfth unit. Now, the unit of distance which is taken as the basis of all tariffs is, generally speaking, 15 kilometres, or 9.3 English miles. As the fare charged, therefore, is ten cents, the fare for nine times that distance and any fraction thereof would be one dollar; that is, one could ride 93 miles for one dollar, but would also have to pay the same sum if he rode only 84 miles. Just so under a strict mileage system one would pay, at three cents a mile, only six cents if he rode 10,560 feet, but would also have to pay the same sum if he rode only 5,281 feet.

This simple system is modified in several ways in the Hungarian method. Thus the first unit of distance is 25 kilometres (15.525 miles); *i.e.*, the fare from any given

* Wherever the price of a ticket is quoted without further description, it is for third-class accommodations on ordinary passenger trains, with no free baggage.

point to any station not more than 15½ miles distant is ten cents, but all units after the first up to the eleventh are 15 kilometres, or 9.3 miles. The eleventh and twelfth are each 25 kilometres, and the thirteenth unit includes all stations beyond the close of the twelfth. For the eleventh, twelfth, and thirteenth units twenty cents each is charged, making the maximum fare to any station within the kingdom from any other one $1.60.*

This last provision, however, is subject to one very important modification; namely, if the traveller's route lies through Buda-Pest, he must buy a ticket first to that place and then another from there to the station he wishes to reach. This may under some circumstances double the fare which he would otherwise have to pay for a journey of equal distance. Buda-Pest is practically a limit, therefore, for the application of the system, having the same effect as a boundary line of Hungary itself.

The zone-tariff of Hungary, then, differs in its effect for those people desiring to go less than 16 miles, for those desiring to go any distance more than 16 and less than 140 miles, and for those who wish to go more than 140 miles. Any distance beyond 140 miles is practically thrown in for nothing to him who buys a ticket for that distance. The rate per mile varies of course within each zone according as the point to be reached is near the one limit or the other of the zone. For example, a station 16 miles distant would just fall within the second zone, and the rate would be 1¼ cents per mile; while one could ride to a station 24 miles distant for the same money, in which case the rate would be ⅝ cent per mile, the former rate being 50% higher than the latter. If we take the middle point of the zone as representing the average trip, we shall find that the fare is, on the average, one cent per mile, varying from ⅝ to 1¼ within the zone. Of course, after reaching the thirteenth zone, the rate per mile decreases rapidly, as the distance travelled for the one fare increases.

*See note on p. 172.

The first zone is treated also in an exceptional manner, since it is longer than any of the following until one reaches the eleventh, and since it is modified by the establishment of two local rates, one of four cents from any one station to the next station, and of six cents from any station to the second station. The rate per mile for a station just at the limit of the first zone — say 15 miles — is only $\frac{2}{3}$ cent.

It is plain from what precedes that the rates of fare are much lower under the new system than they were under the old. In no case beyond the first zone do they exceed $1\frac{1}{4}$ cents per mile, and for the immensely greater number of cases they are less than one cent per mile, averaging probably for the great majority of stations not more than $\frac{3}{4}$ of a cent per mile. For the stations beyond 140 miles the rate per mile decreases with the distance, falling, on the longest trip which can be made for $1.60, to $\frac{3.5}{100}$ of a cent. This last is the rate to Kronstadt, distant from Buda-Pest 454 miles.

The great reductions are best seen by comparing absolute rates under the old and new systems. The old rate to Kronstadt was $8.80: the new rate is $1.60,— a reduction of 82 per cent. This is, of course, the extreme reduction. But the reduction to a station 248 miles away is 66 per cent., to a station 168 miles away over 50 per cent., and to one 60 miles away still nearly 50 per cent. The average reduction on local rates is about 40 per cent. on the basis of the railway estimates. Besides these rates which represent the price paid for a single-trip ticket by any one who chooses to buy, there are also commutation tickets which afford still cheaper rates. Thus from Buda-Pest to Maglod, 14 miles, one can get a ticket book containing sixty tickets for $3.24, a little less than $5\frac{1}{2}$ cents per trip. These books are transferable, and the owner may use them for persons accompanying him. To Aszod, 33 miles distant, a similar book can be obtained for $9.60, or 16 cents a trip.

We have quoted these rates,— which, as said before, are for third-class ordinary passenger trains, with no free baggage,— because it is believed that the effect of any general reduction of rates can be best seen in the cheapest rate at which railroad service is offered. Wherever the railroads have attempted to develop a mass traffic, they have naturally appealed to local patronage, and have almost uniformly abolished the privilege of free baggage, as in the case of commutation tickets on our American railways. The rates fixed for baggage charges in Hungary are also very low. The charge for 120 pounds or less is ten cents for the first 34 miles or fraction thereof, 20 cents for distances up to 62 miles, and 40 cents for all distances beyond that. For 240 pounds or less, provided it exceed 120 pounds, the rates are double those just given; for more than 240 pounds, they are doubled again. One may travel, therefore, from Buda-Pest to Kronstadt for $1.60, and take 500 pounds of baggage along with him for $1.60 more; or, if he be satisfied with the moderate amount of 120 pounds, he can take it along with him for 40 cents additional, making his ticket and trunk cost $2.00 for 457 miles of travel. Those articles which the traveller can take with him into the car are free, such as ordinary handbags and valises.

The tickets for first class cost just double as much as those for third class. Those for second class are four-fifths the price of first class, except for the last two zones, in which they are a trifle less. Speaking generally, therefore, the rates for first class are about 2 cents per mile; those for second class, 1.6 cents per mile, except in the last zone, where they decrease with the distance. The rates for express trains are 20 per cent. higher in each case than those just given, making 2.4, 1.9, 1.2 cents per mile for the three classes, respectively, except for the thirteenth zone again. The rates to Kronstadt would be 70, 51, and 35 hundredths of a cent respectively, and for

express trains 84, 61, and 42 hundredths per mile. The price of a ticket to Kronstadt, first class, on an express train, with a trunk weighing 150 pounds, would be $4.64, or a cent a mile. The price for a distance of 140 miles would be the same, and the rate, therefore, 3⅓ cents per mile.

To present the matter clearly, it is best to make a comparison with actual prices charged in this country. From Philadelphia to New York, a distance of ninety miles, the fare is $2.50, whether one goes by express train or by ordinary passenger, except that for one train an extra fare of $1 is charged. For the parlor car, in case one is attached to the train, a charge of 50 cents extra is made, except for the one train just mentioned, in which case it is included in the $1. Free baggage to the amount of 150 pounds is allowed.

In Hungary, the charge for 150 pounds of baggage would be 80 cents; the tickets by ordinary trains, .90, $1.44, and $1.80; by express trains, $1.08, $1.80, and $2.16. The fares, then, in Hungary for that distance, with 150 pounds of baggage, would range between $1.70 and $2.96; while between New York and Philadelphia they range between $2.50 and $3.50. If the traveller were content with 120 pounds of baggage (more than the average travelling trunk weighs), the Hungarian rates would range from $1.30 to $2.40. If the rates were taken for shorter distances or for much longer distances, the comparison would be much more favorable to Hungary.

A great simplification in management has been the result of the new system in Hungary. The kinds of tickets have been greatly reduced in number. Where an office, like that in Buda-Pest, had to keep 700 different tickets in stock, 92 are now found sufficient. The tickets are now sold, like postage-stamps, in the post-offices, hotels, and cigar-shops, making it unnecessary to

keep such a large number of employees in the railroad stations themselves, and enormously increasing the convenience of obtaining tickets. Owing to this and other features, the costs of railroad administration have been largely reduced.

The expectations of the railway office in regard to increased traffic have not been disappointed. The number of passengers rose steadily from month to month, the increase for the first five months being over 133 per cent. of the average number for the corresponding five months of preceding years. The returns for the first eight months — *i.e.*, to April 1, 1890 — show an increase of 169 per cent., with the tendency steadily upward. The most remarkable fact is the enormous growth of local traffic. Under the old system, only 255,000 persons used the railway in going from station to station; while the number rose for the eight months ending March 31, 1890, to 4,367,586,— an increase of 1,600 per cent.*

In turning from the Hungarian to the Austrian experiment, one is struck both by the similarity and differences. They are both zone-systems, both involve a great reduction in rates over the old systems, and both are very simple in the general plan as well as in the details. The differences will appear more clearly after a discussion of the Austrian system.

There is a sort of permanent rivalry between the Austrian provinces and Hungary in all matters pertaining to industry as well as politics. When the Hungarian management adopted the zone-system, the public in Austria criticised the Austrian railroads for their slowness and seeming neglect of public interest. The management of the Austrian roads has been, therefore, somewhat on the defensive.

* The above are the official figures; but it is not plain from the report exactly what is meant by "local traffic," whether it includes only the travel from one station to another or from one station to the second, or from one station to any station within the first zone.

In a communication addressed to the American Academy of Political and Social Science, dated September 24, 1890,* the General Traffic Manager of the Austrian State Railroads, Dr. C. Wessely, calls attention to the fact that the railroad office had long been proposing a radical change in the tariff system; and, although Hungary got ahead of them, it was merely because the obstacles in the way of a change were, relatively speaking, few and unimportant in Hungary, while they were many and serious in Austria. In Hungary the bulk of the mileage is in the absolute ownership and control of the State. The system is well organized and fairly well developed, having reached its greatest linear extension,—*i.e.*, from one boundary of the kingdom to the other. On the other side of the Leitha, on the contrary, railroad conditions are still in a complicated condition. The State manages over forty different roads, for each of which separate accounts must be kept. The Austrian system is, moreover, in a continual state of expansion; and the possibility of acquiring new roads and the necessity of fitting such additions into the general scheme complicate very much the problem to be solved. The rates, moreover, on the Austrian roads were much lower than those on the Hungarian roads; and consequently the possible reductions are confined to much narrower limits. Moreover, the car-space is, as a whole, better utilized, so that increased traffic would necessitate extensive outlays of capital at a much earlier period than in the case of Hungary.

The new system went into operation in Austria on the 16th of June, 1890. The basis of rates is very simple. The lowest monetary unit of the country (the kreutzer) combined with the shortest long-distance unit of measurement (the kilometre) is made the unit of calculation. The fundamental rate of calculation is one kreutzer per kilometre, the kreutzer being four mills and the kilo-

* Printed in the *Annals of the Academy*, October, 1890, p. 344.

metre .621 mile. This is equal to a rate of about 6½ mills per mile. The price for second class is double and for first class treble this sum. These rates are increased 50 per cent. for express trains. The privilege of free baggage is abolished.

If the kilometre were made the basis of computing the price of tickets, this system would not differ essentially from the old system in use. But in determining the fare the unit of distance is not 1, but 10 kilometres for all distances under 50 kilometres, 15 kilometres for all distances between 50 and 80 kilometres, 20 kilometres from 80 to 100, and 50 kilometres for all distances over 100 kilometres. Thus the fare for the first unit of distance — *i.e.*, 10 kilometres — is 10 kreutzers; *i.e.*, ten times the normal rate fixed upon as the unit of calculation. For the second unit the fare is 10 kreutzers additional, and so on up to the sixth, where for the sixth and seventh the unit is 15 kilometres and the additional price is 15 kreutzers. The eighth unit has 20 kilometres, and the additional price is 20 kreutzers. The ninth, tenth, eleventh, and twelfth units have each 25 kilometres, and the additional price is 25 kreutzers; while after that each unit has 50 kilometres, and the additional price is 50 kreutzers.

The distance up to 200 kilometres is thus divided into twelve units, or zones; and there are as many zones after that as there are stretches of 50 kilometres each or fractions thereof. Tickets are sold by zones at the rate of

I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	XV.	XVI.
10,	20,	30,	40,	50,	65,	80,	100,	125,	150,	175,	200,	250,	300,	350,	400,

etc., kreutzers for the corresponding zones,— the number of kreutzers representing also the number of kilometres included up to the end of the respective zone.

It will be seen that the system is very simple. The tickets contain the number of the zone, the name of the station of departure, and also the name of the last station, on all the lines of the system, in the particular zone to which the ticket entitles the holder to transportation. In

arranging the zones, the whole group of railroads in Austria to which this method applies is considered as one system or road. Tables showing the actual distribution of stations among the zones are posted in all the stations, so that the traveller can see at a glance for what zone he must take a ticket. The variety of tickets is very small compared with the old plan. The system is still further simplified by the fact that two third-class tickets may be presented in lieu of one second-class, and three third-class in lieu of one first-class. This enables small stations to get along with one kind of ticket,—a great advantage from the point of administration.

A curious feature of the system is that, owing to the fact that the unit of distance adopted for local traffic is so much smaller than the one for distance traffic, a traveller finds it under certain circumstances cheaper to take a distance ticket and a local ticket rather than one distance ticket. Thus, suppose he wishes to go to a station just within the sixth zone. The ticket would cost 65 kreutzers; but by taking a ticket to a station near the close of the fifth zone, which would cost 50 kreutzers, and then another to the station he wishes to reach for 10 kreutzers, he would save 5 kreutzers. He could save 40 kreutzers in the same way if he wished to reach a point just within the thirteenth zone,—say 202 kilometres from the starting-point. The regulations, however, forbid travellers to avail themselves of this device.

It is plain from the above statement that the Austrian system differs in some important respects from the Hungarian. In the first place, it does not favor long-distance traffic to such an extent as the latter. As seen above, one may ride in Hungary 731 kilometres for 400 kreutzers. It costs 750 kreutzers to ride that distance in Austria. On the other hand, it never costs more than that in Austria; while in Hungary, if half the route lie on one side of Buda-Pest and the other half on the other, it

would cost 800 kreutzers for the same distance. The regular rates in Austria for distances up to 225 kilometres are cheaper than in Hungary. A ticket for 210 kilometres in Austria costs 250 kreutzers; in Hungary, 350: for 110 kilometres in Austria, 125; in Hungary, 175: for 75 kilometres in Austria, 80; in Hungary, 125. The differences between the prices for the first zone are slightly in favor of Hungary. If one wishes to go, say 24 kilometres, the cost in Austria would be 30, and in Hungary 25 kreutzers. The local-traffic tickets in Hungary and the general commutation tickets in Austria reduce the rates for short trips very considerably below the zone rates. The smaller units adopted by Austria in the new zones are a favor to local traffic, which is, perhaps, not exceeded by the excellent local-traffic tickets in Hungary.

The charge for baggage in Austria is also determined according to a different principle from that in Hungary. A uniform charge of $\frac{2}{10}$ kreutzer per kilometre is made for each 10 kilograms of baggage. This makes small trunks for short distances cheaper than in Hungary, and large trunks for long distances dearer. Thus a trunk weighing 20 kilograms would cost in Hungary 50 kreutzers for 75 kilometres: in Austria it would cost only 30 kreutzers. On the other hand, a trunk weighing 150 kilograms would cost 400 kreutzers in Hungary for 731 kilometres; while in Austria it would cost 2,193 kreutzers, or over five times as much. If we take the average length of a trip in Hungary under the old system, 61 kilometres, as a basis of comparison, and 50 kilograms as the average amount of baggage carried, the difference would appear to be as follows: In Hungary the fare for ticket, including the charge for baggage, would be 150 kreutzers: in Austria it would be 126. Taking the average trip in Austria, 37 kilometres, as the basis, the rates would be: in Hungary, 75 kreutzers; in Austria, 77.

The Austrian roads permit tickets to be sold at reduced

rates far more generally than the Hungarian roads. Pupils travelling to and from school every day a distance not exceeding 50 kilometres are carried for half-fare tick ets. Workmen's tickets are sold good for third-class pas sage at one-half the regular rates for distances not exceeding 50 kilometres. Laborers travelling in companies of not less than ten persons can get half-fare rates for dis tances not less than 300 kilometres.

To get a clear idea of how low these rates are, we must convert them into miles and cents. The fundamental rate adopted for calculation is, as stated above, 6.436 mills per mile. No ticket is sold for less than 10 kreutzers, or say 4 cents. But this ticket is good to any station not more than 6.2 miles distant. The next ticket costs 8 cents, good for any station not more than 12.4 miles distant. And thus, disregarding fractions of a mile, the tickets run 12 cents for any distance up to 18 miles,

16 cts.	up to	24	miles	70 cts.	up to	108	miles
20 "	"	31	"	80 "	"	124	"
26 "	"	40	"	100 "	"	155	"
32 "	"	50	"	120 "	"	186	"
40 "	"	62	"	140 "	"	217	"
49 "	"	77	"	160 "	"	248	"
60 "	"	93	"				

and so on, the price of the ticket increasing after the twelfth zone by twenty cents for every additional 31 miles or fraction thereof. The rate per mile actually charged varies with the position of the station within the zone. Thus, if a station is just beyond the limit of the fourth zone, say 25 miles distant, the rate per mile, since the fare is 20 cents, is .8 cent; while, if it fall just short of the sixth zone, say 30 miles distant, the rate would be .66 cent per mile. To a station 156 miles distant, the rate would be .64 cent per mile; while to one 185 miles away the rate would be only .54 cent, the absolute fare being the same.

The variations in the rates are not so great under

the Austrian system as under the Hungarian, owing to the fact that the zone increases regularly by 31 miles after the twelfth, whereas in the Hungarian there is no further division after the thirteenth is reached, and no further increase of fares.

If we compare the Austrian rates again with the rates from New York to Philadelphia, it will appear that, while 60 cents is the minimum for ninety miles in Austria, $2.50 is the minimum with us. If we add the price of 150 pounds of baggage for 90 miles, the price of the Austrian ticket would be $1.40. If we add the rate for express train, the price of the ticket would be $1.70. The rates for second and first class express trains, with 150 pounds of baggage, would be $2.60 and $3.50 respectively, — very close to the rates charged here for ordinary first-class and parlor-car service respectively.

If we except the specially low rates offered to travellers in Hungary who desire to go 200 miles and upwards, the zone-tariff revolution in rates would seem to affect those who content themselves with inferior accommodations, or do not care to travel with much baggage, or do not travel over 25 to 50 miles; *i.e.*, it concerns chiefly local traffic, and those classes who would travel at a low rate, but either cannot or will not travel at a high rate. But these are also the very people who must be reached if the principle of low rate of profit and great amount of business to make up for it is to be applied in the railway as in other service.

The experiment has not, of course, been tried long enough to enable us to express a final judgment as to its probable success. In the communication from the Austrian Ministry of Commerce above mentioned, it is stated that the experience of the first three months satisfied the railway managers that they are on the right road, and made such an impression on the managers of several private roads that four of the latter had already agreed to

adopt the new system on the 1st of October. A recent statement which ran the rounds of the newspapers is to the effect that the Hungarian State Railway Office proposes to adopt a zone-tariff system in the freight service also, in which it will probably be followed by the Austrian Office.* It should be said that in the book of railway regulations for the Austrian roads, bearing date of June 16, 1890,† the statement is made that the rates therein given are valid, except so far as considerations of competition may necessitate a departure from them. To what extent this reservation naturally interferes with the application of the system I have no means of knowing.

The reform introduced into the Hungarian and Austrian railway system, while it is a radical departure from the old system in vogue, is very far from corresponding to the proposals made by the writers most prominent in the agitation for change. It may be interesting to note some of the arguments advanced by Hertzka and the replies to them in the Club of Austrian Railway Officials.

In the introduction to the book above referred to,‡ Hertzka makes Brandon's plan the starting-point of his discussion. Brandon demanded a uniform rate, good for the entire kingdom and varying only with the class: 3*d.* for third class, 6*d.* for second, 1*s.* for the first. This plan is exactly similar to that in use in the postal service. It was objected to this that the two things are so different that they cannot be compared, and no argument can be drawn from the experience with the letter post which would apply to the transportation of passengers. The

* The increase in traffic on the Austrian roads during the first three months was 176% as compared with the same period of the preceding year. *Annals of the American Academy*, vol. i., No. 2, p. 349.

† *Tarife und Tarifbestimmungen für den Transport von Personen und Reisegepäck.* Vienna. 1890. A translation of this book will appear in the *Annals of the American Academy*, vol. i., No. 3, January, 1891.

‡ *Das Personenporto*, p. 2.

dragging of a letter weighing one ounce has little similarity to the carrying of a person weighing 150 pounds. This would be true enough, provided that the cost of transportation of a person must in the nature of things be so high that it would be impossible to cover it by a uniform rate. Little attempt was made to investigate the question as to the real facts in the case; but people were content in the first instance to leave it to "sound common sense" to settle the issue. If one, here and there, did take the matter up more in detail, the calculation was made upon the basis of two false suppositions. It was taken for granted that the cost of transporting a person a kilometre would remain the same, no matter how great the number of passengers should become; and also that, if any one could ride from one boundary of the empire to another for a small sum, everybody would do this as a matter of fact. If one looks at the fact, it appears that the average cost of transportation per passenger on the Austrian Southern Railroad is 28 kreutzers (11.2 cents), and that this is also true of the other better passenger roads of Austria. The cars are only about one-quarter filled. Now, a well-filled train costs the railroad no more than an empty one, so that the cost of transportation per person would not be more than 7 or 8 kreutzers (2.8 or 3.8 cents) if the trains could run full. On the average, moreover, travellers only ride a short distance. The average trip on the Austrian Southern is only 46 kilometres (28.6 miles), on the Western only 40 kilometres (24.8 miles), etc. The question then arises, What would be the state of affairs if a single cheap ticket entitled the holder to a ride across the empire, say from the Russian border to Trieste? A moment's reflection will show that this is an absurd question, so far as it is supposed to have any pertinence to the point at issue. The fare might become ever so cheap, might be abolished altogether, and yet with a few exceptions people would travel only to

those points where pleasure or business might lead them. It is impossible to answer the question *a priori* whether under such a system the average length of trip would increase or not. In the post-office business it has not been so. The number of letters transmitted for short distances has increased far more rapidly than that of those for long distances, and it would probably be so in the case of passenger traffic.* Certainly, the average length of trip could probably not exceed 100 kilometres (62 miles) under a low uniform fare system. Now, if it cost twice as much to transport 100 kilometres as 50 (which is far from being the case), the cost of moving the average trip passenger would be only 15 kreutzers (6 cents).

This price does not include interest on capital invested in the railway, but simply operating expenses. Many railroads claim that the present passenger traffic does not pay anything more than operating expenses. This is not, however, borne out by a fair computation of cost. In any case, in the reform proposed, we must make sure that the rate will not only pay interest on a fair share of present capital, but also on the new capital which will have to be expended in enlarging the capacities of the railway to enable it to meet the new conditions. The capitalization of the Austrian-Hungarian roads is about 3.4 billion gulden ($1,360,000,000), the yearly interest 170 million gulden ($68,000,000).† At present the passenger traffic does not cover over 15 per cent. of this sum. Let us suppose that after the introduction of a uniform fare of a few kreutzers the traffic should increase fivefold: then each one of the 250,000,000 passengers who would then use

*In a little pamphlet entitled *Wie soll tarifirt werden?* published anonymously in November, 1889, at Vienna and Leipzig, the author labors to show that under a uniform rate local traffic would increase to such an extent as to swamp the railroads. He prefers a system under which long-distance traffic should be distinctly encouraged, on the ground that it is just this traffic which the railroads can take in immensely greater quantities without necessitating any great increase in equipment.

†Counting the gulden at 40 cents.

the railroads would have to pay an addition of 10 kreutzers (4 cents), in order to secure the management from any loss of revenue. If the traffic increased tenfold, the railroads would have a surplus of 25 million gulden; if twenty-fold, then 75 million. And that such an increase is perfectly possible the experience of the postal service shows. "We claim, then," says Hertzka, "that it is not only possible, but that it is in the interest of the railroads themselves, properly understood, to introduce a uniform rate of 25 kreutzers (10 cents) for the whole extent of the monarchy. It would be advisable to introduce a local rate for stations not more than 30 kilometres distant (18.6 miles) of 10 kreutzers (4 cents)."

Hertzka insists further that the system of first, second, and third class cars should be abolished, and that the American system of a single class should be introduced. He is willing to allow individuals or corporations formed for this purpose to provide better cars, with the right of charging additional fares, as is done by our Pullman Company. And the author then goes on to show that with this increase of traffic it would be possible to utilize the equipment of the railroads to so much better advantage, as to provide ample means for paying the interest on the large additional capital which would be necessary. Thus he instances a case of a short railroad, which, by lowering its fare from 20 to 10 kreutzers, increased its traffic from 1,819 persons in August to 8,383 in September, and 20,865 in December of the same year, while it reached an average monthly traffic of 26,000 for the following year. The daily income rose from 14 to 95 gulden, and a road which up to September had been run at a loss showed a profit of 21,000 gulden for the first year of the new experiment, —a sum equal to the interest at 5 per cent. of 420,000 gulden. He quotes in this connection the celebrated objection of Thiers to the building of a road from Paris to Versailles. "Why," said the illustrious statesman,

"there are not more than twenty or thirty persons who go from Paris to Versailles each day; and, even if this traffic should be increased five or six fold, it would not pay the expense of running a railroad train."

Hertzka also urges the social and industrial importance of such a revolution as this. It would make labor immensely more mobile, and thus increase its efficiency by enabling it to go where it is most wanted. The advantage of this ease of movement to the intellectual development of the country would be no slight one, since nothing breaks up the deadening effects of custom and uniformity so much as a little travel. The industrial efficiency of the agricultural laborer is greatly improved by bringing him into contact with new conditions.

In the address before the Club of Austrian Railroad Officials, Hertzka emphasizes the different treatment of the two classes of traffic by the railroads. In the reports of various railroads one may find a calculation as to the "cost of carrying a passenger one kilometre," which is found by dividing the whole expenditure for passenger service by the number of passengers multiplied into the average number of miles travelled. This is a valuable fact from several points of view; but to make this result a decisive factor in determining the rate to be charged, or to appeal to this result as a proof that fares cannot be lowered, is unreasonable. Railroad managers themselves would object to applying any such principle to the freight traffic. They usually insist that the theoretical "costs of transportation," which should be made the basis of computing rates, are the amount it would cost per ton-mile if the road had all the business it could get by a reasonably low rate of charges. We must be careful, of course, not to indulge in impracticable generalizations: we must admit that the costs of transportation in a thinly populated region or through a rough country are much higher than in a densely populated district or in a level plain where

all conditions are most favorable to cheap operating. On the other hand, it cannot be admitted that the "costs of transportation" should be set at a high figure because the road keeps away business by prohibitive rates. We must beware of the vicious reasoning in a circle contained in the proposition that high rates are justifiable because the amount of business remains small on account of high rates. Let the railroads make a fair attempt to apply the principle to passenger traffic which they have admitted to be justifiable in freight traffic, and they would soon find that it would bring them in greater returns than the freight traffic has done.

The debate which took place in the club, after this address was delivered, was a keen and spirited one. Hertzka held his own well, and succeeded in the course of it in converting several prominent railroad men to his view. I cannot, of course, go into any detailed review of it. But one point was so fully considered that a sort of consensus was reached, and it was generally admitted that distance should not play that rôle in making up railway tariffs which is at present assigned to it. It was agreed that the rates demanded by the railroads were too high, and that some kind of a reform was necessary. About five years later the present system was adopted.

Before closing, it may be worth while to consider briefly what bearing all this movement in Europe has on our own railway problems. As said above, our system of railway fares is constructed on the same principle as that of most European States. It is based on the mileage method. A rate is fixed per mile, and the fare is determined by multiplying the number of miles to be travelled into the rate per mile. The system is modified in many ways by the application of limited, commutation, excursion, package, return, company, servant, thousand-mile tickets, and so on; but the principle remains the same.

This method can certainly not be justified from the

standpoint of "cost of service," since the costs of transportation do not increase in proportion to the mileage. It does not cost a railroad twice as much to carry a passenger two miles as one. It cannot be justified on account of the value of service to the traveller. The value of a trip to him who has to make it depends on the person to be seen, the business to be done, the place to be visited, and not on the number of miles to be covered in getting there. Indeed, one may say that the longer the journey, the less valuable the service, since it wastes the time of the one who must make it. Certainly, thousands of journeys are made nowadays which would not be made if we had not the railroad; and equally certain is it that thousands and thousands of journeys which it does not now pay to make would be made if the railway were faster and the fare lower.

The present system has not given us cheap fares as shown above. It has not led to what may be called a general use of the railway. The United States can show only about six passengers per head of the population. When one considers that in this return are included all the commutation ticket passengers, one sees how little use the great mass of the people make of the railway.*

* The Chicago & North-western Railway, one of the great railways of the world, operates over 4,000 miles of road under conditions which may fairly represent the average conditions of railroading in this country. It charged for passenger service in 1871 a rate of 3.31 cents per mile. It reduced this to 2.17 in 1890,— a reduction of 34 per cent. The traffic rose from one hundred millions to two hundred and ninety millions,— an increase of nearly 200 per cent. The mileage increased, however, from 1,223 to 4,250,— an increase of nearly 250 per cent; *i.e.*, the number of passenger miles per mile of road decreased in the twenty years from 1871–1890 by a very considerable sum. The rates for freight were reduced from 2.87 cents per ton-mile to .98 in the same period, — a reduction of 65 per cent. The traffic increased from two hundred and sixty-eight million to two thousand million ton-miles, so that more than two-and one-half times as much revenue was derived from the traffic at a little more than one-third the price.

The reports show, also, that the average number of passengers carried in a car in 1890 was 12.30; *i.e.*, less than 21 per cent. of the capacity. The average number per train was 42.31, showing that the North-western has a passenger traffic slightly in excess of the general average for the country.

It has not led to a reasonable utilization of train facilities. According to the last report of the Interstate Commerce Commission, the average number of passengers per train in this country during the last year was only 42. The average number of passenger cars per train is three and one-half; *i.e.*, for two hundred seats there are only 42 passengers. The railroad could carry three times as many passengers on the average, without any increase in investment or operating expenses. The three cents a mile demanded of the occasional passenger is an exorbitant price, considering the means at the disposal of the average person for railroad riding. Mr. Atkinson states that the average product of the people of the United States is only 40 cents per day; *i.e.*, it would take the whole average daily product of a family of five to travel thirteen miles on the railway. With two dollars per day as the average product of such a family, there is evidently little left for railroad riding at three cents a mile, after all the necessary expenses are paid.

There are two points in the development of every business where the profits of the business would be the same; — namely, the point of relatively small business and high profits on each transaction, and that of large business and small profits on each transaction. There is no reason in the nature of business why a man having reached the former should go to the latter. But there is a great reason, from the point of view of public interest, why he should do so. Our general economic theory takes for granted that competition will force business along this line. Even if this be true, generally, every one would acknowledge certain exceptions to it. All would agree that it would not be true in the absence of competition. The railroads are, of course, for nine-tenths of their traffic absolutely without competitors. It is necessary, then, for the public to interfere, and compel the railroads to advance along the line whither they would be driven by competi-

tors. Speaking generally, one may say of American as of European roads, They give slow service and costly service when they ought to give fast service and cheap service. What system should be adopted to reach this end railroad engineers may determine. The public should insist that the end be reached.

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